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A METHOD AND APPARATUS FOR PACKAGING ARTICLES WITH A FILM  
OF PLASTIC MATERIAL AND A PACKAGE THUS OBTAINED

FIELD OF THE INVENTION

5 The present invention relates to a method for packaging  
articles with a film of plastic material and an apparatus  
which carries out this method. The invention relates also  
to a package obtained by using the above mentioned method  
and apparatus.

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BACKGROUND OF THE INVENTION

Printed articles, such as books, newspapers, magazines  
and the like, are often packaged with a protective film  
of plastic material, usually transparent, for example  
15 cellophane.

The articles are packaged by known machines having  
conveying means, which feed the articles, regularly  
spaced apart, from a wrapping station to an apparatus,  
which forms wraps of plastic film around the articles.

20 In the above mentioned machines, the band of plastic film  
is fed continuously to the conveying means, aligned with  
the means for feeding the articles to be packaged, and  
operated continuously.

The articles are transferred in a row, suitably spaced  
25 apart, above the band of plastic film, which is wound  
over them, by suitable folding means, thus taking a  
tubular form with the longitudinal edges overlapped.

Afterwards, each wrap is closed around each single  
article by longitudinal welding means, acting on the  
30 overlapped edges of the plastic film, and by subsequent

crosswise welding means, which make some transversal welds between adjacent articles.

Then, the plastic film is cut between transversal welds, so as to obtain single packages.

- 5 In the known apparatuses, the devices used for welding the longitudinal overlapped edges of the plastic film usually include a welding member, with a substantially circular welding surface, arranged in a plane longitudinal with respect to the line feeding the plastic  
10 film.

Pressing means are situated downstream of the welding member for acting on the articles wrapped with the plastic film.

- 15 The European Patent EP 0.220.759 describes a longitudinal welding device, in which the above mentioned welding member is carried oscillating about a horizontal axis, crosswise to the articles forward movement direction. The welding member is heated and skims the plastic band at the overlapped edges thus sealing them to each other.

- 20 Moreover, according to another known solution, the transversal welding means are operated while moving alternately along the longitudinal feeding direction of the articles wrapped with the band of plastic film with the same speed. The band of plastic film is sealed  
25 crosswise during the forward stroke of the welding means.

The above mentioned longitudinal and transversal welding of the plastic film requires a considerable amount of time, remarkable with respect to the duration of the entire packaging cycle.

- 30 The welding time cannot be reduced without compromising the quality of the obtained package, which is an obvious

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limit to the production rate of the known wrapping machines.

#### SUMMARY OF THE INVENTION

- 5 The object of the present invention is to solve the above mentioned problem by proposing a method, for packaging articles efficiently and rapidly, with a film of plastic material, in particular reaching a significant increase in production rate.
- 10 Another object of the present invention is to propose an apparatus for carrying out the above method, with a simple, reliable and versatile structure.

The above mentioned objects are obtained, in accordance with the contents of the claims, by a method for  
15 packaging articles with a film of plastic material, characterized in that it includes the following steps:

- continuous feeding of a band of plastic film to conveying means,
- 20 - application of at least one strip of glue along a longitudinal edge of said band of plastic film;
- application of at least one series of zones of glue (19), regularly spaced apart, crosswise to said band of plastic film;
- 25 - orderly transferring of a series of articles to be packaged to said conveying means, above said band of plastic film supplied to the same conveying means, respectively in positions delimited between said transversal zones of glue;
- 30 - folding of longitudinal edges of said band of plastic film over said articles to assume a tubular

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form around the articles being packaged overlapping said longitudinal edges of said band of plastic film, with said longitudinal strip of glue remaining between said opposite edges of the band;

- 5       - joining said edges of the band of plastic film along said longitudinal strip of glue and said transversal zones of glue;
- crosswise cutting of said band of plastic film at the portions situated between said transversal zones
- 10       of glue, in order to obtain single packages of articles.

The above mentioned method is carried out by an apparatus for packaging articles with a film of plastic material, characterized in that it includes:

- 15       conveying means, on which a band of plastic film is fed continuously;

a glue application station, where a suitable glue is applied;

- first glue applying means, located at said glue
- 20       application station for applying at least one strip of glue along a longitudinal edge of said band of plastic film;

- second glue applying means, located at said glue
- application station for applying at least one series of
- 25       crosswise zones of glue, regularly spaced apart to the band of plastic film;

- stationary folding means for folding longitudinal edges of said band of plastic film over said articles to assume tubular form around the articles being packaged and
- 30       moving along the conveying means, with the longitudinal edges of said band of plastic film overlapped so that

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said longitudinal strip of glue remains between said opposite longitudinal edges of the band;

means for stabilizing a joining of said longitudinal edges of said band of plastic film along said longitudinal strip of glue and said transversal zones of glue;

means for cutting crosswise said band of plastic film at portions located between said transversal zones of glue, in order to obtain single packages of articles.

By using the method as explained herein and the correlated machine for carrying out the method, a package is obtained, which includes an article wrapped in a sheet of plastic material having crosswise ends closed by strips of glue and longitudinal edges of the sheet also joined to each other by means of a strip of glue.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The characteristic features of the invention will be pointed out in the following description of some preferred but not exclusive embodiments, with reference to the enclosed figures, in which:

- Figure 1 is a lateral view of the whole apparatus for packaging articles with a film of plastic material, according to the proposed method;
- Figure 1A shows a portion of the film of plastic material;
- Figure 1B shows an enlarged particular K of Figure 1;
- Figure 2 is a plan view of the proposed apparatus;

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- Figure 3 is a corresponding top view of a band of the plastic film, during article packaging;
- Figure 4 is a lateral partial view of another embodiment of the proposed apparatus.

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#### PREFERRED MODES OF CARRYING OUT THE INVENTION

With reference to the above figures, the reference numeral 1 indicates the apparatus for wrapping articles 2, such as books, newspapers, magazines and the like, with a protective film of plastic material, preferably  
10 transparent, for example cellophane.

The articles 2 to be wrapped are fed orderly to the apparatus 1 by a conveying line 3, equipped, in known way, with suitable driving means 4.

15 The apparatus 1 includes a conveying belt 5, operated continuously in the direction indicated by the arrow A.

A band of plastic film 6 is continuously fed on the conveying belt 5 and is drawn thereby from an inlet area of the articles 2 to be packaged. The band of plastic  
20 film 6 unwinds from a bobbin 16.

Upstream of the area, where the articles 2 to be packaged enter the conveying belt 5, the band of plastic film 6 passes through a station C, in which an appropriate glue, suitably heated, is applied.

25 The station C is located, for example, in a region corresponding to a vertical path of the band 6 extending between suitable deflecting rollers 7.

In the station C, there are first glue applying means 8 and second glue applying means 9, for example spray  
30 nozzles of known type.

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The first glue applying means 8 are aimed at applying a strip of glue 18 along a longitudinal edge of the band of plastic film 6; the second glue applying means 9 are aimed at applying a series of zones of glue 19, regularly spaced apart crosswise to the band of plastic film 6 (see Figure 1A).

The strip of glue 18, as well as the transversal zones of glue 19, are applied preferably on the same side of the band of plastic film 6, and in particular, on the side of the band of plastic film 6 which is to be turned to the inside of the package 2.

The longitudinal edges of the band of plastic film 6 hit the folding means 10, aimed at wrapping the band of plastic film 6 in tubular form around the articles 2 to be packaged, transferred orderly to the conveying belt 5.

The folding means 10 guide the edges of the band of plastic film 6 to cross above the articles 2 and to overlap substantially along the middle longitudinal axis of the conveying belt 5 (see in particular Figure 2).

Downstream of the folding means 10, in the direction A of the conveying belt 5 forward movement, there is a rotary presser belt 11, aimed at acting on the overlapped edges of the band of plastic film 6, substantially in the area covered by the longitudinal strip of glue 18, in order to stabilize the union of the edges.

The position of the rotary presser belt 11 can be adjusted vertically by suitable actuating means.

Cutting means 12 are situated downstream of the rotary presser belt 11, in a region corresponding to a loop made in the conveying belt 5, defined by a series of deflecting wheels 14.

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The cutting means 12 are aimed at cutting crosswise the band of plastic film 6 in regions corresponding to joined portions of the transversal zones of glue 19, so as to obtain single packages of articles 2.

- 5 In the present case, the cutting means 12 include a pair of counter-rotating rollers 13A, 13B, respectively upper and lower, with a suitable cutting members T provided on their peripheral surface.

10 The cutting member T includes a blade 50, carried radially by the upper wheel 13A and situated between two presser elements 60A, 60B, aimed at pressing two side by side crosswise portions 19A, 19B in the zone 19. The portions 19A, 19B will be separated upon cutting the zone 19 by the blade 50.

- 15 Consequently, according to the method for packaging the articles 2, in the station C a strip of glue 18 is applied along a longitudinal edge of the band of plastic film 6, as well as in the crosswise glue zones 19 regularly spaced apart on the band of plastic film 6.

- 20 The glue can be applied in a continuous way, at points or any other suitable way required by the use.

Figure 4 shows a different embodiment of the apparatus, in which the first glue applying means 8 have a pair of counter-rotating wheels 15, touching the band of plastic  
25 film 6 and fed by a suitable tank of glue 17, so as to apply a continuous strip of glue 18 along a longitudinal edge of the band of plastic film 6.

The band of plastic film 6 with the glue applied thereto, is fed continuously to the conveying belt 5, above which  
30 the articles 2 to be packaged are transferred orderly, in respective positions defined between the transversal zones of glue 19.



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Then, the folding means 10 fold the edges of the band of plastic film 6 to form a tube around the articles 2 to be packaged, transferred orderly onto the conveying belt 5, so as to overlap the edges of the band of plastic film 6, with the longitudinal strip of glue 18 touching the opposite edge of the band of plastic film 6.

Then, the rotary presser belt 11 acts on the overlapped edges of the band of plastic film 6 substantially in the area with the longitudinal strip of glue 18, so as to stabilize the longitudinal joining of the edges.

The band of plastic film 6, wrapped in tubular form around the articles 2 reaches the counter-rotating rollers 13A, 13B of the cutting means 12, which stabilize, due to the action of the small presses 60A, 60B, the joining of the portions with the transversal zones of glue 19, and cut the band 6 crosswise, by the cutting member T.

It is to be noted that the band of plastic film 6 is cut crosswise by the blade 50 along the portions joined by the transversal zones of glue 19, and more precisely, in the middle of the zones 19, that is between the portions 19A, 19B (see Figure 3).

Consequently, the proposed method achieves the object of packaging articles with a film of plastic material in an efficient and rapid way, in particular it reduces the packaging cycle duration, and therefore, increases considerably the productivity.

The package obtained, shown in Figure 3 still partially joined to the plastic band, includes an article, such as a magazine, a book, a newspaper or the like, wrapped in a sheet 6 of plastic material having the ends 19A, 19B closed by strips of glue between the upper and lower

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parts of the sheet. The longitudinal edges of the sheet are also joined to each other by means of a strip of glue 18.

5 This result is achieved, in particular, due to the fact that the longitudinal joining of the edges of the plastic film, wrapped around the articles in tubular form, and the transversal joining of the same tubular plastic film, between two adjacent articles, are obtained by the use of a suitable glue, applied to the plastic film in an  
10 appropriate working station.

In other words, the proposed solution overcomes the technical problems of the known apparatuses, in which the longitudinal and crosswise joining of the edges of the plastic film are obtained by heat-welding in that it  
15 eliminates all the heat-welding means necessary for sealing the plastic band and all the problems connected thereto, well known to those skilled in the art.

It is also to be pointed out that this result is obtained by a simple, reliable and versatile apparatus.

20 It is understood that the proposed invention has been described, with reference to the enclosed figures, as a mere, not limiting example. Therefore, it is obvious that any changes or variants applied thereto remain within the protective scope of the present technical solution, as  
25 described above and claimed below.